

REMARKS:

NOTICE OF APPEAL

The Applicant files herewith a Notice of Appeal under 37 CFR 1.191 along with the appropriate fee.

5 **SUMMARY OF THE OFFICE ACTION AND THIS RESPONSE**

In the outstanding Office Action, Claims 1-8, 16-18, 21-27 and 41-52 were rejected only under 35 USC 103(a) as being unpatentable over Kravitz in various combinations with other references. The Applicant respectfully traverses these grounds of rejection as set forth below.

CLAIM REJECTIONS UNDER 35 USC 103

- 10 The Examiner has rejected claims 1-8, 16-18, 21-27 and 41-52 under 35 USC 103 as being obvious over US Patent 5,790,730 to Kravitz et al. (hereinafter Kravitz) in view of U.S. Patents 5,846,638 to Meissner (herein after Meissner), 5,195,150 to Stegmuller (hereinafter Stegmuller), 5,200,010 to Funami (hereinafter Funami) and 5,449,630, to Lur (hererinafter Lur). In response, the Applicant submits that the Examiner's rejection does not establish a prima facie
- 15 case of obviousness for the reasons set forth below.

The fact that two materials are different does not require that they have two different refractive indices.

- The present application claims a hybrid microlens having a "first layer" with a low index of refraction, and a "second layer" with a higher index of refraction and a microlens formed thereon. In an interview with the Applicant and Joshua D. Isenberg on January 29, 2004, the
- 20 Examiner restated his rejections and stated that Kravitz teaches that the "first" and "second" layers may be different materials and that it is inherent that different materials have different refractive indices. According MPEP 2112: "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the
- 25 reference, and that it would be so recognized by persons of ordinary skill. The Applicants submit that while different materials can have different refractive indices, it is by no means necessary that this must always be so, and as will be proven in the following discussion on AR coating, in Kravitz it is not so. The Applicant submits as proof a printout from the website of

Science Daily (http://www.sciencedaily.com/encyclopedia/List_of_indices_of_refraction). Also submitted is a printout in which the list has been sorted in order of index of refraction to better illustrate that several different materials can have the same or very close indices of refraction. Also submitted is a similar list from the website of Norland Products (<http://www.norlandprod.com/adhesives/adhchart.html>). Norland lists at least nine different adhesives having a refractive index of 1.56. Thus, the Examiner has not established inherency since different materials do not necessarily have different refractive indices.

The Fact That The Teachings Of Kravitz Can Be Combined Or Modified Is Not Sufficient To Establish *Prima Facie* Obviousness

The Examiner has interpreted the teachings of Kravitz to mean that the relative thicknesses of the two layers are interchangeable and that Kravitz teaches the claimed refractive indexes. The Applicants contend that Kravitz lacks an express teaching that the “first layer” has a smaller refractive index and greater thickness than the “second layer”. The mere fact that references or teachings can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. For example, in *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed.Cir.1990) claims were directed to an apparatus for producing an aerated cementitious composition by driving an output pump at a capacity greater than the feed rate in order to draw air into the composition. The prior art reference in *Mills* taught that the feed means could be run at a variable speed. However, the court found that this does not require that the output pump be run at the claimed speed so that air is drawn into the mixing chamber and is entrained in the ingredients during operation. The court concluded that although a prior art device “may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so.” 916 F.2d at 682, 16 USPQ2d at 1432).

A situation analogous to *Mills* exists in the present case. Here, the Kravitz reference teaches that the “second layer” (layer 30 in Kravitz) can be made out of a list of materials, and “first layer” (layer 14 in Kravitz) can be made out of a similar list of materials. The Applicants respectfully point out that the Examiner has incorrectly identified layer 32 of Kravitz as corresponding to the low index “first layer”. More properly the relevant layer is Kravitz’s substrate 14. The claimed combination of high index for the “second” layer and low index for

the "first" layer is one of several possible combinations. The Examiner argues that because Kravitz teaches that silicon and glass may be used as in the layers 30 and 32, Kravitz teaches that the "second layer" can have a higher refractive index than the "first". The Applicants contend that the Examiner has "cherry picked" among the teachings of Kravitz to arrive at the claimed combination.

Even if, *arguendo*, it were inherent that different materials have different refractive indices, the Applicants submit that these teachings of Kravitz do not require that the "second layer" have a higher refractive index than the "first" or that the "second layer" be substantially thinner than the "first". The Examiner has pointed to teachings in Kravitz showing that different materials can be used and a list of different materials for the "second layer" 30 and the "first layer" substrate 14. From this list of possible materials, the Examiner has chosen a combination that meets the requirement that the "second" layer have a greater refractive index than the "first". The Examiner has argued that Kravitz teaches a layered structure from different materials and an ability to optimize the layered structure for different purposes and that on this basis Kravitz *in combination with further prior art* teach all the limitations of the claims. The Examiner's argument is analogous to arguing that a teaching of a variable feed rate is equivalent to a teaching that an output pump can be run at a capacity greater than the feed rate.

Even if, *arguendo*, the apparatus of Kravitz could be modified, the Examiner has pointed to no teaching or suggestion in either Kravitz or Meissner or any other reference that the apparatus of Kravitz be modified to operate as claimed. Instead, the sections cited by the Examiner (col. 7, lines 9-11 and 14-16) make only a general statement that different materials may be used and that the layer may be optimized for different purposes. Absent such a showing in the prior art, the Examiner has impermissibly used the Applicants teaching to hunt through the prior art for the claimed elements and combine them as claimed. (see *In re Vaeck*, 947 F. 2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991); *In re Bond*, 910 F. 2d 831, 15 USPQ 2d 1566 (Fed. Cir. 1990); *In re Laskowski*, 871 F. 2d 115, 117, 10 USPQ 2d 1397, 1398 (Fed. Cir. 1989)). As such, a *prima facie* case of obviousness is not present with respect to the pending claims.

The Examiner Has Cited No Teaching Supporting His Interpretation Of Kravitz with Respect to Lens Sag and the Sum of the Two Layer Thicknesses

The Examiner has interpreted the teachings of Kravitz in Fig. 5b as disclosing the functional attributes of the lens sag and sum of the two layer thicknesses. However, the Examiner has not
5 pointed to any specific teaching or suggestion in Kravitz supporting this interpretation. Nor has the Examiner pointed to any teaching or suggestion in Kravitz or any of the other cited references that it would be desirable to reduce the lens sag and the sum of the layer thicknesses. Nor has the Examiner pointed to any teaching or suggestion that making the "second layer" with a higher refractive index than the "first" would accomplish this. Absent such a showing in the
10 prior art, the Examiner has impermissibly used the Applicants teaching to hunt through the prior art for the claimed elements and combine them as claimed. As such, for the reasons set forth above, a prima facie case of obviousness is not present with respect to the pending claims.

Furthermore, none of the cited references teach the problem solved by the invention or its source. Specifically, no cited reference teaches *the desirability of reducing the lens sag and the sum of*
15 *the two layer thicknesses*, (for the wafer stacking technology page 2, lines 3-9, for which the Applicant is a pioneer). The Applicants submit that reducing the overall thickness and lens sag is desirable for several reasons, such as much improved (by 20 times, see page 6, lines 20-23 of the present application) manufacturability of refractive lenses with large diameters and large numerical apertures (see, e.g., page 6, line 24 to page 7, line 7 of the present application), and
20 increased chip count per wafer stack. These are issues which Kravitz never had to deal with, because in Kravitz's invention, a large chip has a few microlenses sparsely populated at the center and most of the chip area is for individual attachment to the metal container after wafer dicing, because otherwise the chip would be too small to handle. In wafer stacking technology, however, there is no need for further handling of the chips and therefore the chips can be very
25 small and wafer chip count becomes important. **The present invention therefore successfully solves a problem never before even recognized and provides an advantage which never before was appreciated.**

In particular, refractive lenses with large diameter and low aberration are desirable for dual fiber collimators (see e.g., page 1 to page 2 line 18). The Applicant is currently using the hybrid microlens technology in its collimator array product line. Kravitz, by contrast simply does not mention dual fiber collimators or any other reason for desiring large diameter, low lens sag, low-thickness lenses. It is well established that a patentable invention may lie in the discovery of a problem even though the remedy may be obvious once the source of the problem is identified (see, e.g., *In re Sponnoble* 56 CCPA 823, 832, 405 F.2d 578, 585, 160 USPQ 237, 243 (1969) and *In re Peehs*, 612 F.2d at 1290, 204 USPQ at 837 (CCPA 1980)). In *Peehs*, the Federal Circuit reversed a Patent Appeals board that had found obvious claims to a nuclear fuel rod with a roughened end. The Federal Circuit found it particularly relevant that the cited prior art did not address the sticking and stressing problems that the claimed invention was designed to eliminate (612 F.2d at 1289). Here, the cited art does not address the problem of manufacturing large diameter, low lens sag, low-thickness lenses for dual fiber collimators or any other reason. As such, the Examiner has not established a prima facie case of obviousness.

The rejections of claims 2, 3, 7, 17, 18, 21, 23, 48 and 49 are based on impermissible hindsight since the Examiner has not to shown any motivation for modifying Kravitz with the teachings of Meissner

The Examiner has rejected claims 2, 3, 7, 17, 18, 21, 23, 48 and 49 as being obvious over Kravitz in view of Meissner. In rejecting these claims the Examiner has merely pointed to sections of Meissner that purportedly teach the claimed features. However, the Examiner has not pointed to any teaching or suggestion, in either Kravitz or Meissner tending to show a motivation for making the particular modifications on which the rejections of these claims are based. Therefore, the Examiner has not established a prima facie case of obviousness since obviousness cannot be established absent some teaching, suggestion or incentive supporting the combination (ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F. 2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984)). Absent such a showing in the prior art, the Examiner has impermissibly used the applicants teaching to hunt through the prior art for the claimed elements and combine them as claimed (see *In re Vaeck*, 947 F. 2d 488, 20 USPQ 2d 1438 (Fed. Cir. 1991); *In re Bond*, 910

F. 2d 831, 15 USPQ 2d 1566 (Fed. Cir. 1990); In re Laskowski, 871 F. 2d 115, 117, 10 USPQ 2d 1397, 1398 (Fed. Cir. 1989)). The use of hindsight is never permissible to establish obviousness.

The Examiner has not given proper weight to the teachings of Kravitz with respect to anti-reflection coating of surfaces 18 and 28 but not the interface between the “second layer” 30 and the “first layer” substrate 14.

It is well established that where the teachings of the prior art conflict, the Examiner must weigh the suggestive power of each reference (MPEP 2143.01). Here Kravitz teaches anti-reflection coating the cavities 44 at the back surface 28 of layer 32 and/or the microlenses 16 (see col. 9, lines 37-40). Specifically, Kravitz teaches AR coating cavity 44 and mentions coating microlenses 16 casually in parenthesis (see col. 9, line 39). However, Kravitz does not teach anti-reflection coating the surface between the “second layer” 30 and the substrate 14 or between the substrate 14 and the layer 32. Such a teaching strongly suggests that the “second layer” 30 has an index of refraction that is very close in value to that of the substrate 14 or layer 32. If, arguendo, the “second layer” were made of silicon it would have a refractive index of about 3.5, a substrate or “first layer” made of glass would have a refractive index of about 1.5. If this structure were surrounded by air of refractive index 1.0 one would calculate a reflection coefficient of about 4% at the surface 28, a reflection coefficient of about 32% at the surface 18, and a reflection coefficient of about 15% at an interface between the “second layer” 30 and the “first layer” substrate 14. That Kravitz teaches AR coating the surfaces 28 (with a mere 4% reflectivity) and 18 (with 32% reflectivity) but not the interface between them (with a big 15% reflectivity) indicates that Kravitz teaches such an AR coating is not needed and would be inconsistent with the purpose of the invention in Kravitz. Furthermore, the lack of a teaching of an AR coating between the “second layer” 30 and the substrate 14 or between the layer 32 and the substrate 14 strongly suggests that Kravitz teaches that these layers have the same refractive index. Thus there would be no technological motivation to combine Meissner with Kravitz to arrive at the claimed invention.

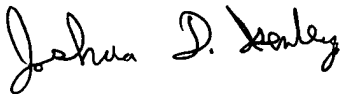
Thus, for the reasons set forth above, the Applicants submit that **Kravitz teaches away from the combination with Meissner** with respect to claims 7, and 41-46, which recite an anti-reflection

coating between the first and second layers. It is well established that references cannot be combined where one reference teaches away from their combination (See MPEP 2145 (X)(D)(2). Kravitz teaches away from the invention of having two refractive indices for the two layers with the "first layer" having a lower refractive index than the "second" and an AR coating between them as recited in claims 7, and 41-46. As such, for at least this additional reason, a prima facie case of obviousness is not present with respect to claims 7, and 41-46 and the claims as they presently stand in the application define an invention suitable for patent protection.

CONCLUSION

For the reasons set forth above, the Applicant submits that all claims are allowable over the cited art and define an invention suitable for patent protection. The Applicants therefore respectfully request that the Examiner enter the amendment, reconsider the application, and issue a Notice of Allowance in the next Office Action.

Respectfully submitted,



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